

UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 6610

CSAH NO. 15

OVER THE

MINNESOTA RIVER

DISTRICT 8 - CHIPPEWA COUNTY



PREPARED FOR THE

MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

COLLINS ENGINEERS, INC.

JOB NO. 5221 (CEI 94)

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. 6610, Piers 1 and 2, were found to be in good condition with no defects of structural significance. As in the previous inspection, the footing at Pier 2 was exposed at the downstream end with a maximum vertical exposure of 3 inches. A light accumulation of timber debris was observed at Pier 1, and a light to moderate accumulation of timber debris was observed at the upstream end of Pier 2. The channel bottom consisted of firm sand and cobbles and appeared to be stable with no appreciable changes or increased scour since the previous inspection.

INSPECTION FINDINGS:

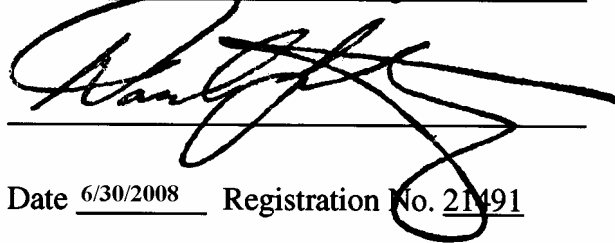
- (A) The footing was exposed on the west side at the downstream column of Pier 2 with a maximum vertical exposure of 6 inches.
- (B) A light accumulation of timber debris, consisting of 6 to 8 inch diameter branches, was observed at the upstream nose of Pier 1 and along both sides of the pier.
- (C) A light to moderate accumulation of timber debris, consisting of up to 1 foot diameter logs, was observed at the upstream nose of Pier 2 and extending to the east shoreline. A light accumulation of timber debris also extended along both sides of the pier.

RECOMMENDATIONS:

- (A) Monitor the accumulations of timber debris at the piers, and if found to be increasing, removal during routine maintenance to prevent further build-up and to restrict scour influence may be required.
- (B) Because the bridge has been evaluated to be scour critical, specifically monitor the footing exposure during future inspections and after periods of high flows.
- (C) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

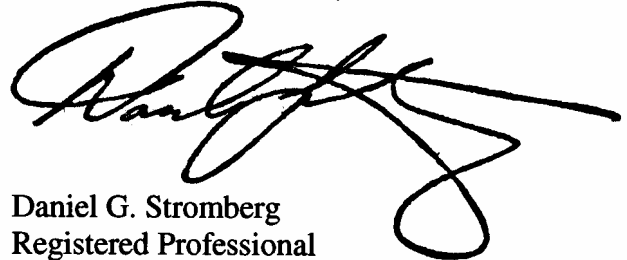
Daniel G. Stromberg



Date 6/30/2008 Registration No. 21491

Respectfully submitted,

COLLINS ENGINEERS, INC.



Daniel G. Stromberg
Registered Professional
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 6610

Feature Crossed: Minnesota River

Feature Carried: CSAH No. 15

Location: District 8 - Chippewa County

Bridge Description: The superstructure consists of three spans of multiple steel beams supporting a reinforced concrete deck. The superstructure is supported by two reinforced concrete piers and two reinforced concrete abutments. The superstructure was widened in 1990 with the addition of two pile bents and an additional steel beam. The original substructure units are founded on square reinforced concrete footings founded on steel H-piles. The piers are numbered 1 and 2 starting from the west end of the bridge.

2. INSPECTION DATA

Professional Engineer/Team Leader: Daniel G. Stromberg, P.E., S.E.

Dive Team: Clayton G. Brookins, Valerie Roustan

Date: October 20, 2007

Weather Conditions: Sunny, 65° F

Underwater Visibility: 0.5 feet

Waterway Velocity: Negligible/None

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1 and 2.

General Shape: The original piers each consist of two hexagonal-shaped reinforced concrete columns supporting a rectangular reinforced concrete cap. The columns are each supported by a square concrete footing founded on steel H-piles. The extended portion of the piers added to the north end of the bridge each consist of a single H-pile encased in concrete and a steel pile shell. The steel shell and concrete encasement extend up into the rectangular reinforced concrete cap.

Maximum Water Depth at Substructure Inspected: Approximately 7.2 feet.

4. WATERLINE DATUM

Water Level Reference: The top of the pier cap on the downstream end of Pier 2.

Water Surface: The waterline was approximately 10.1 feet below reference.
Waterline Elevation = 920.7.

5. NBIS CODING INFORMATION (Minnesota specific codes are used for 92B and 113)

Item 60: Substructure: Code 7

Item 61: Channel and Channel Protection: Code 6

Item 92B: Underwater Inspection: Code B/10/07

Item 113: Scour Critical Bridges: Code R/96

Bridge is scour critical because abutment or pier foundation is rated as unstable due to observed scour at bridge site.

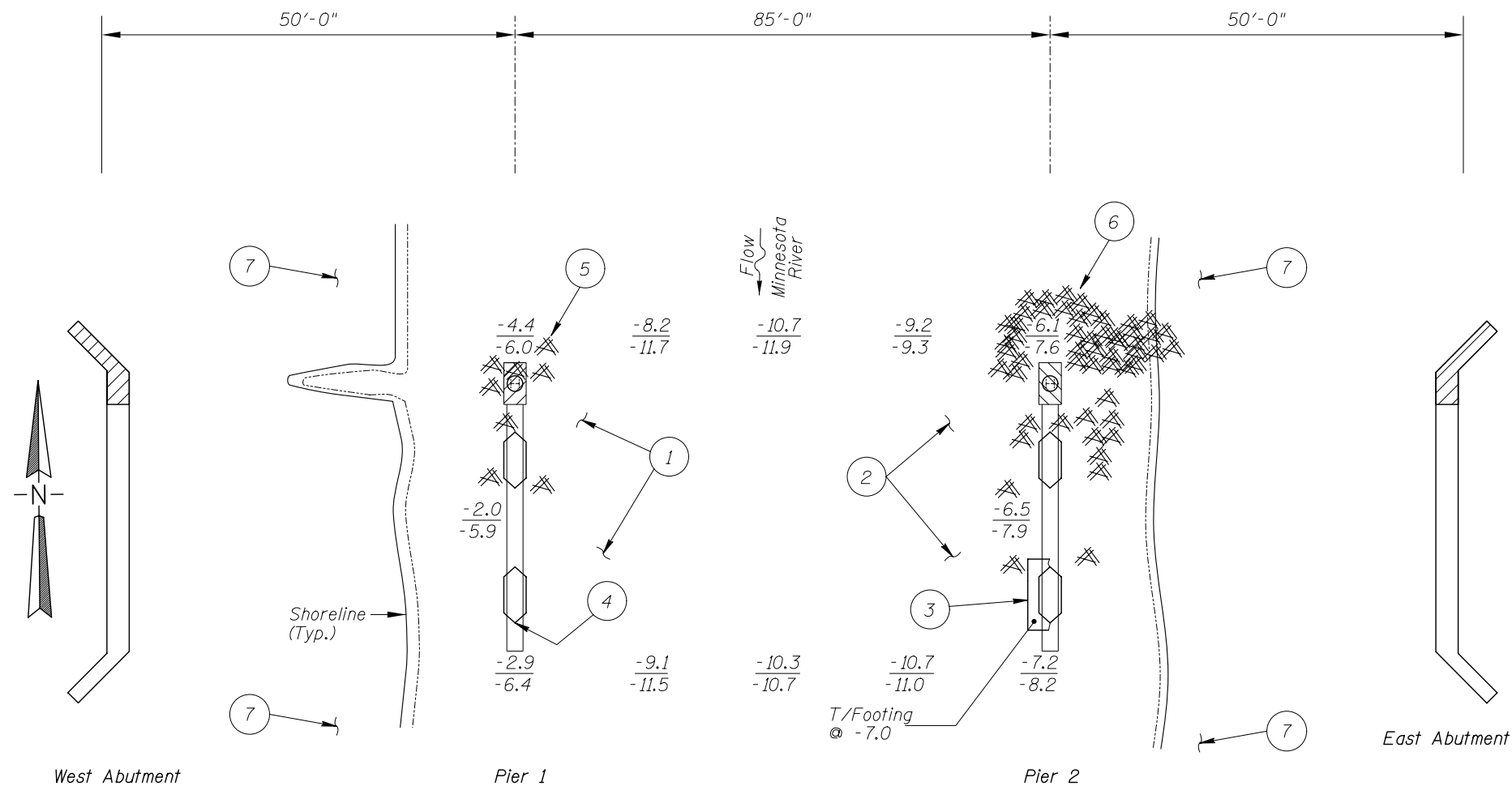
X Yes No



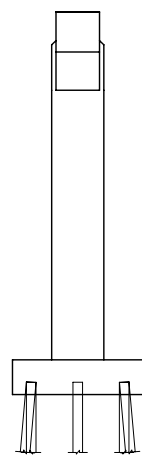
Photograph 1. View of Pier 1, Looking East.



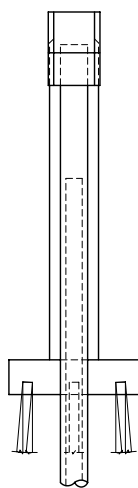
Photograph 2. View of Pier 2, Looking East.



SOUNDING PLAN



TYPICAL DOWNSTREAM END VIEW
OF PIERS



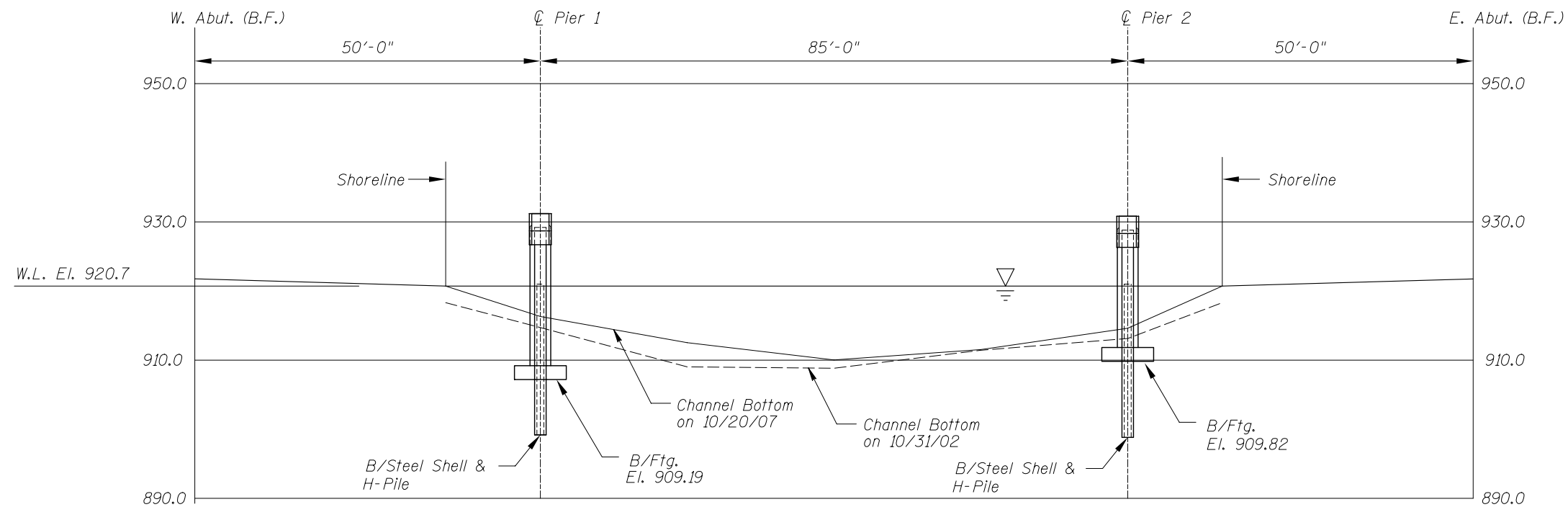
TYPICAL UPSTREAM END VIEW
OF PIERS

Note:
All soundings based on 2007 waterline location.

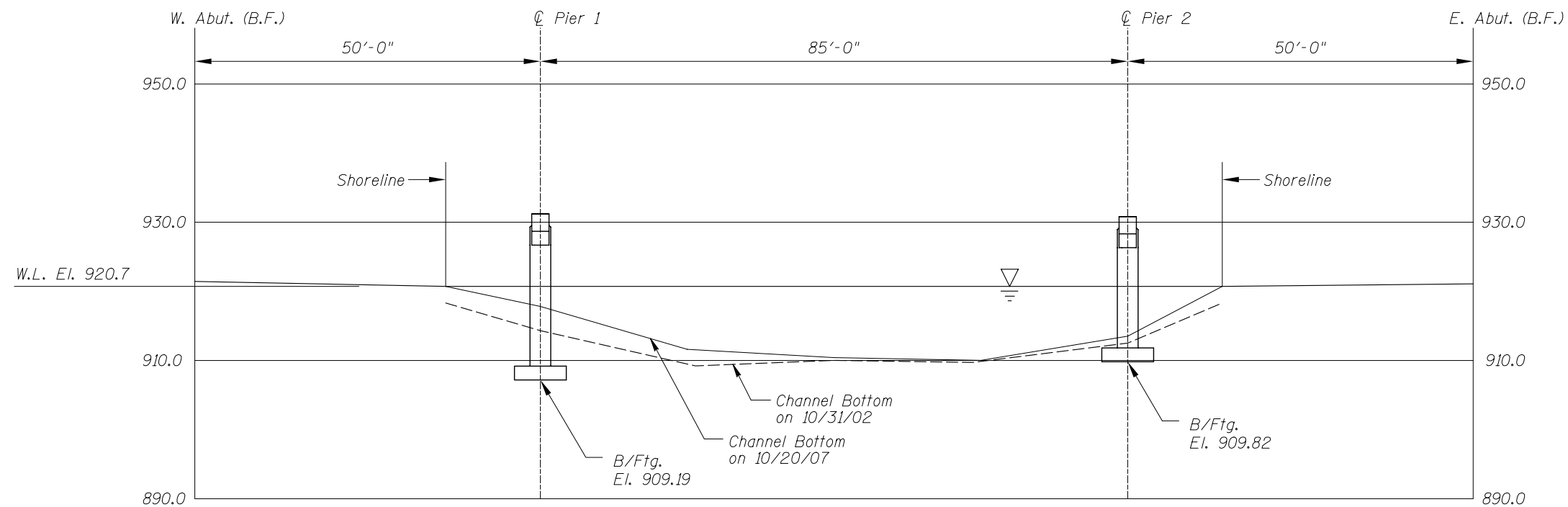
- Legend
- 2.0 Sounding Depth (10/20/07)
 - 5.2 Sounding Depth (10/31/02)
 - Steel Pile Shell
 - ⊢ Steel H-Pile
 - ▨ Indicates Bridge Widening (c. 1990)
 - Timber Debris

- GENERAL NOTES:
- Piers 1 and 2 were inspected underwater.
 - At the time of inspection on October 20, 2007 the waterline was located approximately 10.1 feet below the top of the pier cap at the downstream end of Pier 2. This corresponds to a waterline elevation of 920.7.
 - Soundings indicate the water depth at the time of inspection and are measured in feet.
 - Soundings were taken parallel to the bridge at 1/4 point intervals between the substructure units.
- INSPECTION NOTES:
- The channel bottom material around Pier 1 consisted of silty sand with approximately 6 inches of probe rod penetration.
 - The channel bottom material around Pier 2 consisted of cobbles, 6 inch diameter riprap, and sandy silt with 4 inches of probe rod penetration.
 - The footing was exposed at the west side at the downstream column of Pier 2 with a maximum vertical exposure of 6 inches.
 - A light area of section loss was observed 2 feet above the waterline at the downstream nose of Pier 1, measuring 3 square inches with 1 inch of penetration.
 - A light accumulation of timber debris, consisting of 6 to 8 inch diameter branches, was observed at the upstream nose of Pier 1 and extended along both sides of the pier.
 - A light to moderate accumulation of timber debris, consisting of up to 1 foot diameter logs, was observed at the upstream nose of Pier 2 and extended to the shoreline, and a light accumulation of timber debris extended along both sides of the pier.
 - Heavy bank erosion resulting in vertical slopes upstream and downstream of the structure on the east and west banks. Banks are well protected at structure with up to 2 foot diameter riprap and concrete revetment. The west embankment protection was covered with silty sand.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 6610 OVER THE MINNESOTA RIVER DISTRICT 8, CHIPPEWA COUNTY		
INSPECTION AND SOUNDING PLAN		
Drawn By: LJ	COLLINS ENGINEERS 123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com	Date: OCT. 2007
Checked By: VR		Scale: NTS
Code: 52210094		Figure No.: 1



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:

Refer to Figure 1 for General Notes.

**MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION**

STRUCTURE NO. 6610
OVER THE MINNESOTA RIVER
DISTRICT 8, CHIPPEWA COUNTY
**UPSTREAM AND DOWNSTREAM
FASCIA PROFILES**

Drawn By: LJ	COLLINS ENGINEERS	123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com
Checked By: VR		
Code: 52210094		

Date: OCT. 2007
Scale: 1"=20'
Figure No.: 2

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES
DAILY DIVING REPORT

INSPECTORS: Collins Engineers, Inc. DATE: October 20, 2007

ON-SITE TEAM LEADER: Daniel G. Stromberg, P.E., S.E.

BRIDGE NO: 6610 WEATHER: Sunny, 65° F

WATERWAY CROSSED: Minnesota River

DIVING OPERATION: ☒ SCUBA ☐ SURFACE SUPPLIED AIR
☐ OTHER ☐

PERSONNEL: Clayton G. Brookins, Valerie Roustan

EQUIPMENT: Scuba, U/W Light, Scraper, Lead Line, Sounding Pole, Probe Rod, Camera

TIME IN WATER: 3:30 p.m.

TIME OUT OF WATER: 4:00 p.m.

WATERWAY DATA: VELOCITY Negligible/None

VISIBILITY 0.5 feet

DEPTH 7.2 feet maximum at Pier 2

ELEMENTS INSPECTED: Piers 1 and 2

REMARKS: Overall, the concrete piers and the steel pipe pile shells were in good condition with no structurally significant defects observed. At the downstream column of Pier 2, there was up to 6 inches of vertical exposure of the footing. A light to moderate accumulation of timber debris was observed at the upstream nose of Piers 1 and 2. The embankments, upstream and downstream of the structure, exhibited nearly vertical slopes due to heavy erosion. The channel banks at both abutments were well protected with up to 2 foot diameter riprap and a concrete revetment.

FURTHER ACTION NEEDED: ☒ YES ☐ NO

Monitor the accumulations of timber debris at the piers, and if found to be increasing, removal during routine maintenance to prevent further build-up and to restrict scour influence may be required.

Because the bridge has been evaluated to be scour critical, specifically monitor the footing exposure during future inspections and after periods of high flows.

Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 6610
INSPECTORS Collins Engineers, Inc.
ON-SITE TEAM LEADER Daniel G. Stromberg, P.E., S.E.
WATERWAY CROSSED Minnesota River

INSPECTION DATE October 20, 2007
NOTE: USE ALL APPLICABLE CONDITION
DEFINITIONS AS DEFINED IN THE MINNESOTA
RECORDING AND CODING GUIDE INCLUDING
GENERAL, SUBSTRUCTURE, CHANNEL AND
PROTECTION, AND CULVERTS AND WALL
DEFINITIONS TO COMPLETE THIS FORM.

CONDITION RATING

UNIT REFERENCE NO.	UNIT DESCRIPTION	MAXIMUM DEPTH OF WATER	SUBSTRUCTURE						CHANNEL					GENERAL					
			PILING	COLUMNS, SHAFTS, OR FACES*	FOOTINGS	DISPLACEMENT	OTHER	OVERALL SUBSTRUCTURE CONDITION CODE*	SCOUR	EMBANKMENT EROSION	EMBANKMENT PROTECTION	OTHER (DRIFT/DEBRIS)	OVERALL CHANNEL & PROTECTION CONDITION	CONCRETE	STEEL	TIMBER	LOSS OF SECTION	PREVIOUS REPAIR OR MAINTENANCE	OTHER
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Pier 1	4.4'	7	7	N	9	N	7	8	6	7	7	6	7	7	N	7	N	N
	Pier 2	7.2'	7	7	7	9	N	7	7	6	7	7	6	7	7	N	7	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, the concrete piers and the steel pipe pile shells were in good condition with no structurally significant defects observed. At the downstream column of Pier 2, there was up to 6 inches of vertical exposure of the footing. A light to moderate accumulation of timber debris was observed at the upstream nose of Piers 1 and 2. The embankments, upstream and downstream of the structure, exhibited nearly vertical slopes due to heavy erosion. The channel banks at both abutments were well protected with up to 2 foot diameter riprap and a concrete revetment.

NOTES: ATTACH SKETCHES AS NEEDED, IDENTIFY REMARK BY REFERRING TO UNIT REFERENCE NO. AND REMARK NO.
USE GENERAL SECTION TO IDENTIFY OVERALL PRESENCE OF SPALLS, CRACKS, CORROSION, ETC.